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ABSTRACT

Accountability in vocational education is discussed as consisting of two subsystems, one providing data about developing new programs and the other as providing data for answering questions about the quality of existing programs. The Minnesota model for product evaluation, the latter subsystem, is discussed. It is predicated on the theory that vocational programs serve a dual role--they provide society with a source of skilled workers where there is a demand for skilled workers (social maintenance) and they provide the individual with skills to progress in an occupation where his/her needs can be fulfilled. The Minnesota Satisfaction Questionnaire (to be completed by a student) and the Minnesota Satisfaction Scales (to be completed by the immediate supervisor) were chosen as measurement instruments for a pilot test of the model, and a study was conducted to determine the sensitivity and reliability of these scales before the pilot test. Ss were all the students who graduated from a post-secondary vocational program in one of nine curriculum clusters in Minnesota in 1968-69 and who were employed one year after graduation, a total of 1,229. Results were not positive, but evidence for rejection of the scales was not conclusive. Suggestions for further research are made. (KM)

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Project IMPROVE: Developing and Testing a Statewide System for Evaluation of Vocational Education Programs

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INTRODUCTION

It has been said that the concept of accountability is much like taxes; it's difficult to cope with but a necessary part of the total system. In this day and age, when funds are limited and financial commitments are dependent upon the ability of educational programs to demonstrate their effectiveness and efficiency, accountability assumes an even more important role than it has in the past.

The Minnesota Research Coordinating Unit for Vocational Education has been concerned with the problem of accountability for vocational education and is conducting programs of research aimed at developing and implementing such a system in the State. The purposes of this presentation are to share with you some of the ideas which have been generated as well as some of the findings our research has produced. This presentation is divided into the following three parts: (1) A brief description of our concept of accountability, (2) a discussion of a model for "product evaluation", and (3) a summary of the results of research to test the sensitivity of selected criterion measures for product evaluation.

ACCOUNTABILITY

Educational accountability is a construct which suggests that vocational educators are responsible for offering high quality programs to all students

who want and can benefit from such programs. Conceptually, it may be viewed as a total system for collecting information concerning program objectives such that educators can make decisions to improve both the quantity and quality of their programs. In this sense, a total system of accountability is perceived as a tool for decision-making which requires a systematic procedure for collecting, analyzing, and interpreting empirical data about programs.

In terms of the kinds of decisions which vocational educators are typically required to make and the data requirements for making these decisions, a total system of accountability must necessarily consist of two separate but related data collection subsystems.

The first subsystem deals with decisions about the quantity, type and location of programs. This is most often referred to as a subsystem for program planning and development which attempts to answer such questions as: Are programs satisfying the demand for vocational training? Are programs serving the numbers and kinds of students it should be serving? What new programs should be offered and where should they be located? What programs should be terminated as a result of insufficient demand? In order to answer these kinds of questions, a data collection system which attempts to obtain an adequate match between labor supply and demand is necessary.[1]

The second type of subsystem deals with decisions about the quality of existing vocational programs and is typically referred to as "program evaluation". The concern here is to obtain information about how "good" or how "successful" a program is and then make decisions with respect to improving or terminating programs. In most instances, program operators have relied

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[1]The Minnesota RCU is currently developing and testing a model for program planning that will attempt to (a) identify the needs of students K to adult, and (b) match these needs with a demand for skilled labor and vocational training programs.

upon information or data only about the quality of the instructional "process". In comparison, relatively little has been done to develop an evaluation subsystem that attempts to assess the quality of programs in terms of the on-the-job behaviors of former students.

In summary, a total system of accountability is perceived as a process of collecting and analyzing empirical evidence to make decisions about either the quantity or quality of existing vocational programs. A total system, therefore, consists of two subsystems: One subsystem provides data about developing new programs (program planning) and the other provides data for answering questions about the quality of existing programs (program evaluation).

PRODUCT EVALUATION: AN ACCOUNTABILITY SUBSYSTEM

The Minnesota RCU has long been concerned with the problem of developing a state operated evaluation subsystem. The State of Minnesota has already made advancements in developing an evaluation procedure which centers on assessing the quality of the instructional process. Both self evaluation techniques and evaluation by independent teams composed of educators and representatives from industry have been used to assess the quality of each vocational curriculum in the State. Because there is also a need to assess the quality of vocational programs in terms of their products, the Minnesota RCU has been given the responsibility to continue developing a rationale and model for evaluating the quality of post-secondary vocational programs in the State. The remainder of this report is devoted to a discussion of the model for product evaluation and a summary of the results of research that has been conducted.

Purpose of Vocational Education

The model for product evaluation is predicated on the principle that public vocational education programs are developed to enhance the mutual

satisfaction of both society and the individual. That is, vocational programs serve a dual role: they provide society with a source of skilled workers who are capable of performing satisfactorily in an occupation where there is a demand for skilled workers (social maintenance) and they provide the individual with skills to obtain and make progress in an occupation where his/her needs can be fulfilled (self-fulfillment).

Figure 1 illustrates the purposes of public vocational education programs and the relationship among these purposes. Since vocational education is primarily concerned with the on-the-job performance of former students, its major thrust is towards improving the work adjustment of the individual, and maintaining an appropriate distribution of skilled workers in the labor force. Each of these purposes is circumscribed by the concept that vocational education is responsible for providing training opportunities to all students who want and can benefit from such training.

The concept of work adjustment has been defined as the correspondence between (a) the abilities of the individual and the ability requirements of the job, and (b) the needs of the individual and the need reinforcers (satisfiers) of the job.[2] To the extent that correspondence is obtained, an individual is said to have achieved "work adjustment" which will lead to a job or occupational tenure.

For the purpose of product evaluation, work adjustment and the maintenance of an appropriate distribution of workers in light of the labor demands represent the criterion for assessing program effectiveness. The distribution of workers in terms of labor demand is determined by whether a former student

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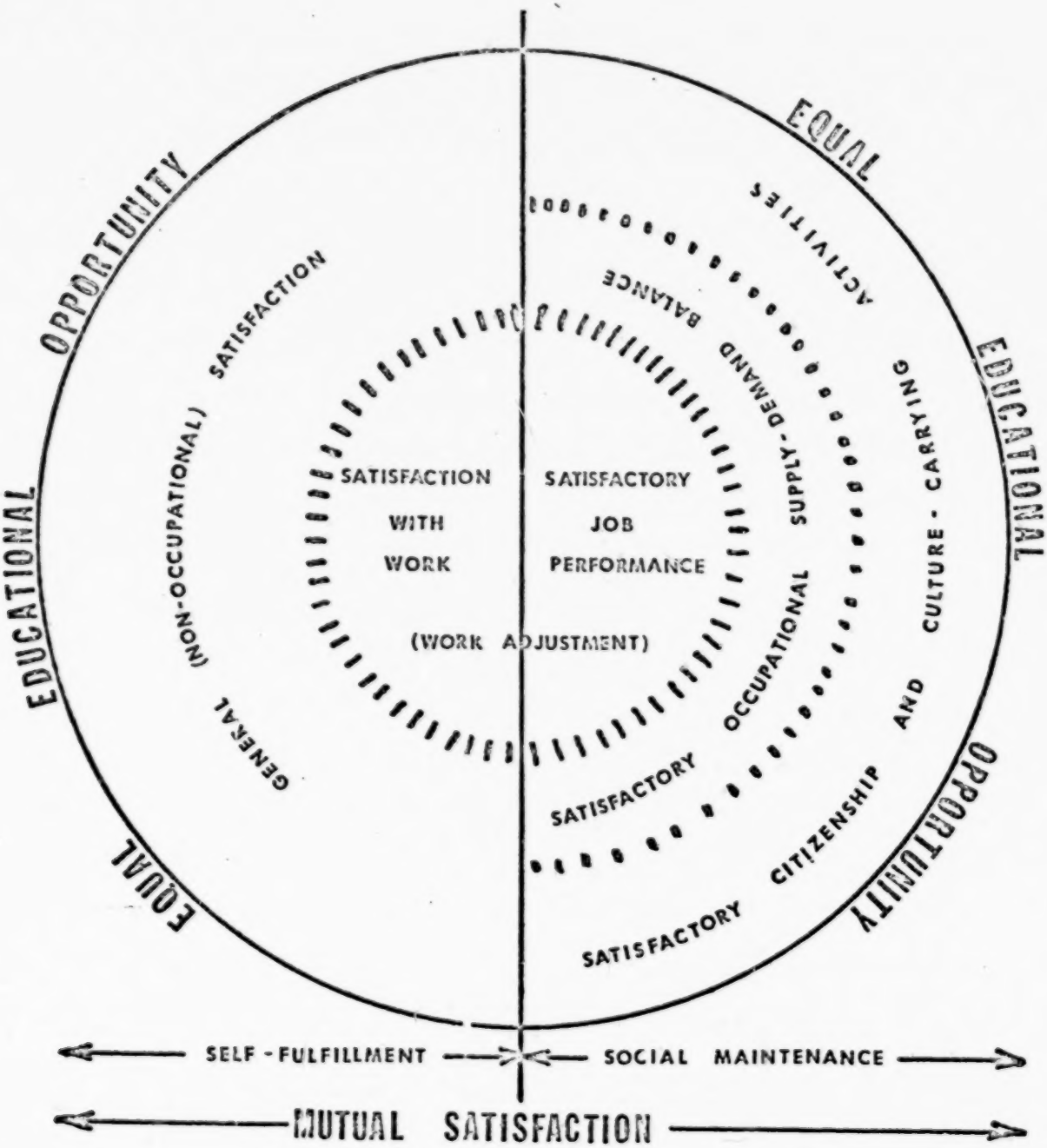
[2]See R. V. Dawis, L. N. Lofquist and D. J. Weiss A Theory of Work Adjustment (a revision), Minnesota Studies in Vocational Rehabilitation, xiii, Minneapolis, University of Minnesota, 1978.

FIGURE 1

Relationships Among Purposes



obtained employment in a job unrelated to training, directly related to training, or broadly related to training.[3]

In order to pilot test and further develop the model, two instruments which purport to measure the construct of work adjustment were selected because of their potential for use as criterion measures for product evaluation. Students complete the Minnesota Satisfaction Questionnaire (MSQ) and his/her immediate supervisor completes the Minnesota Satisfaction Scales (MSS). Work satisfaction (how satisfied an individual is with his job) is measured by the MSQ which consists of three scales: (1) Extrinsic Satisfaction, (2) Intrinsic Satisfaction, and (3) General Satisfaction. Satisfactory job performance is measured by the MSS and consists of five scales: (1) Performance, (2) Conformance, (3) Dependability, (4) Personal Adjustment, and (5) General Satisfactoriness.

Program evaluation which attempts to assess the "quality" of the program is dependent upon comparing the actual, observed outcome of a program with some standard. There are three types of performance standards which may be used: (1) an arbitrarily fixed standard, (2) standards based on norm groups, or (3) comparative standards. Since there was no available rationale for establishing a fixed standard for either satisfaction or satisfactoriness and since norms have not been developed on these measures, the comparative standard was selected as the basis for evaluating vocational programs. This means that only programs which provide training for the same work roles are to be compared in terms of their relative effectiveness in the improvement of the work adjustment of the individual.

A production function, a concept borrowed from economics and used in conjunction with regression techniques, is to be used to make comparisons

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[3]For a more complete explanation of job-relatedness see Wheeler, D. N. Technical report no. 5: The measurement of job relatedness for vocational program evaluation. Minneapolis: Minnesota Research Coordinating Unit for Vocational Education, 1971.

among programs within each vocational cluster while simultaneously controlling for differences in student characteristics, socio-economic conditions, and other intervening variables. Since the validity and sensitivity of the two measures of work adjustment to serve as criterion measures for the evaluation of vocational programs has not been established, this phase of the evaluation model has not been completed.

In summary, the model for product evaluation is based on the principle that the purpose for public vocational education is to improve the work adjustment of individuals and to maintain an appropriate distribution of skilled workers in the labor force such that the mutual satisfaction of both the individual and society are maximized. The criterion measures selected for comparing vocational programs, using a production function, regressional analysis technique, were the Work Adjustment Projects' measures of the individuals' work satisfaction and satisfactory job performance.

RESEARCH CONCERNING CRITERION MEASURES FOR PRODUCT EVALUATION

One of the major problems involved in developing a state operated product evaluation subsystem is the lack of sufficient data concerning the characteristics of former students and their subsequent on-the-job performance. Fortunately, the State of Minnesota has been able to develop a comprehensive data base consisting of measures on all Minnesota post-secondary vocational school students (about 20,000) for a two year period as a result of a federally funded project called Project MINI-SCORE and a State financed Vocational Follow-up Project. With the cooperation of Drs. Howard F. Nelson and David J. Pucel, it was possible for the Minnesota RCU to begin testing the previously discussed model for product evaluation.

The major purpose of our research effort was to determine the sensitivity and reliability of the Work Adjustment Projects' measures of job satisfaction

and satisfactoriness which are to be used as criterion measures for pilot testing the evaluation model. In order to examine the validity of these instruments for our purposes, answers to the following four questions were sought:

1. Are measures of satisfaction and satisfactoriness sufficiently sensitive to discriminate among programs within a curriculum cluster?

2. Are programs within a curriculum cluster homogeneous with respect to the types and/or characteristics of the students enrolled?

3. Can variations in measures of satisfaction and satisfactoriness be explained (accounted for) by measures of student characteristics?

4. Are the measures of job satisfaction and satisfactoriness reliable?

Population

The population consisted of all the students who graduated from a post-secondary vocational program in one of nine curriculum clusters in Minnesota during the year 1968-1969 and who were employed one year after graduation. Table 1 lists the nine curriculum clusters and the number of programs and students within each cluster. Curriculum clusters were selected to insure representation according to sex. Only schools which had a total of ten or more employed graduates during the two year period were selected for analysis. In all cases, comparisons were made only between programs within curriculum clusters. Analyses between clusters have already been completed by the staff of Project MINI-SCORE.

TABLE 1

SUMMARY OF THE POPULATION ACCORDING TO CURRICULUM CLUSTER, AND NUMBER OF SCHOOLS AND STUDENTS WITHIN EACH CURRICULUM CLUSTER

Curriculum	No. of Programs	No. of Students
Power and Home Mechanics	5	60
Practical Nursing	11	299
Auto Mechanics	13	129
Mechanical Drafting and Design	7	70
Machine Shop	4	59
Welding	8	56
Cosmotology	6	91
Accounting	12	165
Clerical	14	300
TOTAL:	80	1229

Findings

Question #1: Are measures of satisfaction and satisfactoriness sufficiently sensitive to discriminate among programs within a curriculum cluster?

One-way analysis of variance (ANOVA) was used to compare programs within each of the nine curriculum clusters on the basis of the mean scale scores for both the three scales of job satisfaction (MSQ) and the five scales of job satisfactoriness (MSS). Data were computed using responses of students who were classified in each of the following three categories of job relatedness: (1) employed, (2) employed in a job directly related to their training, (3) employed in a job broadly related to their training.

No significant differences (.05 level) were found with any of the scales for either the MSS or MSQ at each of the three levels of job relatedness. This finding can be explained in one of three ways: (1) the instruments may not be sensitive to differences among programs, (2) variation in the measures might be due to error of measurement (unreliability), or (3) programs could be, in fact, homogeneous and therefore differences are not expected. Subsequent analyses were conducted to determine the viability of these alternatives.

Question #2: Are programs within a curriculum cluster homogeneous with respect to the types and/or characteristics of the students enrolled?

One-way ANOVA was used to compare programs within each of the nine curriculum clusters on the basis of their mean scale scores on each of the following instruments: General Aptitude Test Battery (GATB), 16 Personality Factors (16PF), Minnesota Vocational Interest Inventory (MVII), Minnesota Scholastic Aptitude Test (MSAT), Vocational Development Inventory (VDI) and the Minnesota Importance Questionnaire (MIQ). The scales for each of these instruments are listed in Appendix A. Analyses were conducted on the scores of students who were classified according to three previously mentioned levels of job relatedness.

With only minor exceptions (certain scales of interest, personality and occupational needs), no significant differences were revealed. This strongly suggests that program operators tend to have similar entrance requirements and tend to enroll students who have quite similar characteristics.

This finding also suggests that one of the reasons that these measures of job satisfaction and satisfactoriness could not detect differences among programs was because there was no differential affect of programs on students who were relatively similar when they entered the program. Subsequent analyses were necessary to determine whether the variation in the two criterion measures can be accounted for by student characteristics or error of measurement.

Question #3: Can variations in measures of satisfaction and satisfactoriness be explained (accounted for) by measures of student characteristics?

Multiple correlation was used to assess the amount of variation that the GATB and MVII could account for in each scale of the MSQ and MSS for only those students employed in a job broadly related to the training program from which they had graduates. In this instance, only schools having at least 30 graduates were used for the analysis. This assured an adequate ratio of the number of variables to the number of students. In few instances were the resulting multiple correlation coefficients statistically significant at the .05 level. This finding suggests that student characteristics, at least in terms of measured aptitude and interest, are not related to the actual on-the-job performance of graduates as measured by job satisfaction-satisfactoriness measures in question. This finding may be explained in one of three ways: (1) student characteristics may be unrelated to performance measures, (2) perhaps student characteristics that are related to these performance measures have not been measured or, (3) the ratio of true variance to error variance is so small that large correlations are not expected.

Question #4: Are the measures of job satisfaction and satisfactoriness reliable?

Previous research conducted by the Work Adjustment Project at the University of Minnesota revealed that the scales of both the MSS and MSQ have satisfactorily high reliability coefficients ranging from about .65 to .98. Only a minimal amount of research has been conducted on the test-retest stability of the instruments dealing with population of students in a psychology class and older, employed workers. These results indicate that the instruments do produce stable results (especially over short periods of time). However, since none of these research efforts dealt with a population similar to the age level of post-secondary vocational school graduates, additional research concerning the reliability of these instruments seemed warranted.

Table 2 shows the coefficients of internal consistency for each scale of the MSQ and MSS for three heterogeneous groups of students who graduated from the post-secondary vocational system in Minnesota.

TABLE 2

COEFFICIENTS OF INTERNAL CONSISTENCY FOR THE SCALES OF THE MSQ AND MSS

MSQ	Group 1	Group 2	Group 3
Intrinsic	.870	.885	.871
Extrinsic	.783	.881	.800
General Satisfaction	.896	.915	.896
MSS			
Performance	.900	.911	.680
Conformance	.841	.873	.837
Dependability	.887	.906	.848
Personal Adjustment	.738	.821	.706
General Satisfactoriness	.946	.954	.925

Table 2 shows coefficients of internal consistency that are within a satisfactory range (.680 to .954). This finding leads one to believe that the variation on the scale scores of both the MSS and MSQ are not due solely to error of measurement, but may, be due to "true" variation in on-the-job performance. Until additional research pertaining to the test-retest stability of the instruments is conducted, a final assessment of the instruments cannot be made.

CONCLUSIONS

The results of research concerning the utility of the MSS and MSQ as criterion measures for a state-operated sub-system of product evaluation have not been as positive as we would have liked. However, evidence for their rejection is not conclusive. Also, the results of research reported here do not detract from or invalidate the rationale for the model of product evaluation presented. The concept of work adjustment and maintaining an appropriate distribution of skilled workers still remain as acceptable purposes for public school vocational education programs. The findings do suggest, however, that additional research is needed in order to perfect a state operated subsystem of product evaluation. The following implications for further research are suggested:

1. Additional research concerning possible sources of unreliability of the MSS and MSQ should be undertaken.

2. Different standards of program comparison (fixed standards or normative bases) should be developed and tested.

3. Measures of job satisfaction and satisfactoriness should be obtained closer to the point of graduation in order to detect any differences which may be due to the educational program.

4. If post-secondary vocational programs are found to be equally effective producers of satisfactory and satisfied graduates, then the relative efficiency of these programs should be compared.

5. Graduates of other forms of vocational training (private, MDTA, apprenticeship, or cooperative programs) and graduates of post-secondary institutions might be compared.

6. Means of assessing job satisfaction and satisfactoriness other than those developed by the Work Adjustment Project may be developed and tested.

APPENDIX A

Instruments and Their Respective Scales Used
to Estimate Student Characteristics

(a) Minnesota Vocational Interest Inventory - (1) Mechanical, (2) Health Ser (3) Office Work, (4) Electronics, (5) Food Service, (6) Carpentry, (7) Sales-Office, (8) Clean Hands, (9) Outdoors.

(b) General Aptitude Test Battery - (1) G - intelligence, (2) V - verbal aptitude, (3) N - numerical aptitude, (4) S - spatial aptitude, (5) P - form perception, (6) Q - clerical perception, (7) K - motor coordination.

(c) 16 Personality Factors - (1) A - reserved, (2) B - less intelligent, (3) C - emotional, (4) E - humble, (5) F - sober, (6) G - expedient, (7) H - shy, (8) I - tough minded, (9) L - trusting, (10) M - practical, (11) N - forthright, (12) O - placid, (13) Q1 - conservative, (14) Q2 - group-tied, (15) Q3 - casual, (16) Q4 - relaxed.

(d) Minnesota Scholastic Aptitude Test - only one score

(e) Vocational Development Inventory - only one score

(f) Minnesota Importance Questionnaire - (1) ability utilization, (2) achievement, (3) activity, (4) advancement, (5) authority, (6) company practices and policies, (7) compensation I, (8) co-workers, (9) creativity, (10) independence, (11) moral values, (12) recognition, (13) responsibility, (14) security, (15) social service, (16) social status, (17) supervision (human relations), (18) supervision (technical), (19) variety, (20) working conditions, (21) work challenge, (22) company image, (23) organization control, (24) feedback, (25) physical facilities, (26) work relevance, (27) company prestige, (28) company goals, (29) closure, (30) compensation II.

SELECTED BIBLIOGRAPHY

Copa, G. H. Technical report no. 4: Identifying inputs toward production function application in education. Minneapolis: Minnesota Research Coordinating Unit for Vocational Education, 1971.

Dawis, R. V., Lofquist, L. H., and Weiss, D. J. A theory of work adjustment (a revision), Minnesota studies in vocational rehabilitation: xxiii. Minneapolis: Work Adjustment Project, University of Minnesota, 1968.

Gibson, D. L., Weiss, D. J., Dawis, R. V., and Lofquist, L. H. Manual for the Minnesota satisfactoriness scales, Minnesota studies in vocational rehabilitation: xxvii. Minneapolis: Work Adjustment Project, University of Minnesota, 1970.

Moss, J. Technical report no. 3: Evaluation of occupational education programs. Minneapolis: Minnesota Research Coordinating Unit for Vocational Education, University of Minnesota, 1968.

Moss, J., Smith, B. B., Pratzner, F., Wheeler, D. N., and Stock. W. Project IMPROVE: The development of a state-operated evaluation system, American Vocational Journal. 1970, 45 (2), 49-52.

Pucel, D. J., Nelson, H. F., and Wheeler, D. N. Differentiating among graduates of vocational-technical curriculums. Minneapolis: Project MINI-SCORE, Department of Industrial Education, University of Minnesota, 1970.

Weiss, D. J., Dawis, R. V., England, G. W., and Lofquist, L. H. Manual for the Minnesota satisfaction questionnaire, Minnesota studies in vocational rehabilitation: xxii. Minneapolis: Work Adjustment Project, University of Minnesota, 1967.

Wheeler, D. N. Technical report no. 5: The measurement of job relatedness for vocational program evaluation. Minneapolis: Minnesota Research Coordinating Unit for Vocational Education, 1971.